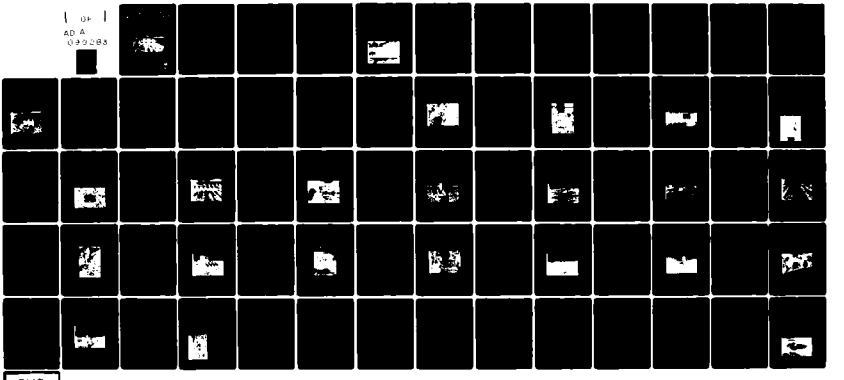
AD-A099 283 HONEY CREEK JOINT BOARD OF SUPERVISORS TIFFIN OH F/6 2/4
HONEY CREEK WATERSHED PROJECT. TILLAGE DEMONSTRATION RESULTS 19--ETC(U)
MAR 80 DACW49-79-C-0008
UNCLASSIFIED NL



END
DATE FILMED
6-81
DTIC

LEVEL #

12

HONEY CREEK WATERSHED PROJECT

TILLAGE DEMONSTRATION RESULTS 1979

PREPARED FOR THE
LAKE ERIE WASTEWATER
MANAGEMENT STUDY
U.S. ARMY ENGINEER DISTRICT, BUFFALO

HONEY CREEK WATERSHED PROJECT,

TILLAGE DEMONSTRATION RESULTS 1979

Project Report for
Contract DACW-49-79-C-0008

by

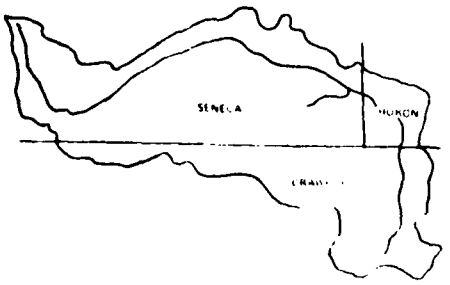
HONEY CREEK JOINT BOARD OF SUPERVISORS
Crawford, Seneca and Huron Counties, Ohio

March 1980

Lake Erie Wastewater Management Study
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207

DISCLAIMER

The use of trade names or company names in this publication does not constitute an endorsement of products or companies.



Honey Creek Watershed Project

COOPERATING AGENCIES
Soil Conservation Service — Soil & Water Conservation District
Cooperative Extension Service
Agriculture Stabilization and Conservation Service

155 E. Perry St.
Tiffin, Ohio 44883

Dear County Farmer:

Improving the quality of water draining from agricultural areas is a big job, but one which must be done. Done right it does not need damage farm income. In fact, it may mean even more profit from your farm operation rather than less. Reduced tillage and no-till farming especially can improve water quality by reducing soil loss through erosion control. Soil retained in your fields means that expensive fertilizers, particularly phosphorus, and herbicides stay in place, too. Time and fuel savings help gain favorable returns from reduced tillage as well. Finally, taxpayer costs to clean ditches and dredge streams and lakes go down. All of these factors, most of which benefits farmers directly, also improve water quality.

Through the Honey Creek Project, you, in cooperation with local agricultural agency people and farm service dealers, can work with us in determining ways to do our share of helping improve Lake Erie water quality. Together, we should be able to demonstrate ways to do the water quality job - economically and practically.

This publication describes results of reduced tillage and no-till demonstration plots carried out within the Honey Creek watershed in 1979. These practices, when properly applied, not only reduce erosion, but also maintain or improve net farm income through economies of manpower, energy and machinery.

Please review the data presented. See how reduced tillage practices might fit into your farm operation. We feel that reduced tillage can directly benefit farmers while at the same time do the water quality job. What do you think? What is your solution? The job must be done!

Sincerely yours,

Lee E. Buckingham

Lee Buckingham, Chairman
Honey Creek Joint Board of Supervisors

LB/JC/jk

A

HONEY CREEK JOINT BOARD OF SUPERVISORS

Lee Buckingham, Chairman
Rondo Berlekamp, Vice-Chairman
Ed Harer, Secretary-Treasurer
Walter Schimpf
Marion Kelbley
Robert Gray
Bob Featheringill

PROJECT STAFF

John Crumrine, Manager
Dave Wurm, Conservationist
Maurey Lewis, Technician

A special note of appreciation to Jean Knoblaugh who typed and retyped the various portions of this manuscript.

SPECIAL ACKNOWLEDGEMENTS

Successful accomplishment of tillage demonstration plots this year resulted from the combined efforts of farmers, agri-business interests and agricultural agency people, Without the support of these people, there would have been no demonstration plots. Special thanks and appreciation to the following people for their part in the demonstration effort:

CRAWFORD COUNTY

Farmer Cooperators:

Don Crum
Ross Eckstein
Gary Green
Don Phenicie
Dick and Ed Harer
Jason Kalb
Tom Niese
Jim and Gerald Nedolast

Task Force Members:

Bill Kleman, County Agent, Chairman
Floyd Reinhart, Atricultural Stabilization & Conservation Service
Bob Smith, Soil Conservation Service
Burton Geissman
Howard Von Stein
Randy Strauch, County Engineer

SENECA COUNTY

Farmer Cooperators:

Harry Hoffert
Bill Smith
Paul Price
Richard Willman
Rich Reichert

Task Force Members:

Bill Stuckey, County Agent, Chairman
Bill Bernard, Agricultural Stabilization & Conservation Service
Bill Smith, Seneca Soil and Water Conservation District
Gene Baltes, Soil Conservation Service
Sam Spitler
Phil Dunn
Rich Reichert
Delbert Morter

HURON COUNTY

Farmer Cooperator:

Mark Fritz

Task Force Members:

Lloyd Young, Soil Conservation Service
John Metz, Huron Soil and Water Conservation District
Jerry Beck, Agricultural Stabilization & Conservation Service
Carlos Tucker, County Agent

OTHERS

Richard Heimlich, Seneca East FFA, Attica, Ohio
Paul Young, Chevron Chemical Co., Lima, Ohio
Paul Price, Silver Valley Agricultural Services, Bloomville, Ohio
Melvin Speece, Landmark Crop Services, New Washington, Ohio
Mike Grapevine, Danville Feed & Supply Co., Danville, Ohio

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

As a result of 1972 Federal legislation, Congress has given the U. S. Army Corps of Engineers responsibility for developing by 1982, a plan to "restore and repair" Lake Erie water quality. Since receiving this responsibility, the Army Corps has worked with other Federal agencies, Canadien officials, States, and numerous universities to develop a plan. Early work identified phosphorus as the element contributing to overenrichment of Lake waters. Plans were made to address significant "point" sources of phosphorus such as waste effluent from major cities. Reductions here, though, could not do the whole job. Treatment of diffuse or "nonpoint" phosphorus sources would be required if the Lake were to return to previous levels of water quality. Of these nonpoint sources, nutrient runoff from agricultural watersheds is most significent.

How, though, was the Corps, experienced as civil engineers, to address nutrient runoff and erosion control in farm areas? Their answer to this question was to ask the agricultural community for help. In November, 1978, this was done contractually through the Joint Board of Supervisors in the Honey Creek watershed.

The Honey Creek Watershed Management Program is a pilot demonstration project. Its purpose is to demonstrate on agricultural lands practices designed primarily for the purpose of improving water quality (Best Management Practices or BMP's). It is to also demonstrate approaches or ways to get practices on the ground. Finally, it is to inform people about agricultural activities - water quality relationships and how they can help develop workable ways to carry out erosion or nutrient control practices (BMP's).

With these goals in mind the Joint Board, with help from Cooperative Extension Service, Soil Conservation Service, and Agricultural Stabilization and Conservation Service, and numerous farm service representatives, began working with farmers to carry out BMP's. Engineering practices such as grassed waterways and erosion control structures were planned as well as numerous plots demonstrating reduced tillage and no-till methods.

This publication reports results of 1979 tillage demonstration plots within the Honey Creek watershed. Plot histories from planting to harvest, economic data and soil erosion information are reported. The publication is <u>not</u> a research document, rather a compilation of data and information gathered while working with landowners to perform tillage demonstration practices. Main effort was "hands on" demonstrations that people could see and judge. Plot results, too, represent data from <u>one year only</u>. Consider this fact when comparing among plots or from plot data to your own experiences.

RAINFALL AND TEMPERATURE - 1979

Cold and wet weather prior to May, 1979, delayed corn planting in demonstration plots until the first and second week of May. Above normal rainfall in May and June, particularly in Crawford County and southeast Seneca County (Table 1) caused bean planting to extend through the end of May and into early June.

During the growing season (May - August), rainfall was 5.71" and 7.08" above normal in Seneca and Crawford Counties, respectively. In Seneca County rainfall was above normal in both June and August, 2.85" and 3.05", respectively. Greatest rainfall amounts were recorded in June after planting, with heaviest distributions in Crawford County and Venice Township of Seneca County. Intense storm activity was also greatest at this time, causing severe erosion and crop replanting in many areas of the watershed.

In fall (September - October) rainfall was near or somewhat below normal for most of the watershed. Lesser amounts of rain at this time did aid harvesting after a very wet summer.

Using records at Tiffin, temperatures were 1 to 3 degrees above normal during the first half of the growing season, but 1 to 2 degrees below normal during the second half. Below normal temperatures in August combined with above normal precipitation produced exceedingly cool and wet conditions during this portion of the growing season. Delayed maturation of corn, lodging of beans and continued erosion were common observations by farmers during August.

Table 1

Precipitation summary (rainfall, inches) by township and county of areas *within the Honey Creek watershed*, 1979.

SENECA CO.	May	June	July	Aug.	Sept.	Oct.	TOTAL
Bloom Twp.	4.98	4.33	4.15	5.76	3.22	1.89	24.33
Eden Twp.	3.02	4.16	4.58	7.88	2.63	2.55	24.82
Venice Twp.	5.33	5.21	3.64	6.46	2.56	2.03	25.23
SENECA Ave.	4.44	4.57	4.12	6.70	2.80	2.16	24.79
Deviation*	(+.74)	(+.72)	(+.54)	(+3.71)	(-.14)	(-.29)	(+5.28)
CRAWFORD CO.							
Auburn Twp.	3.87	5.46	3.60	4.97	3.45	2.85	24.20
Chatfield Twp.	4.94	6.76	3.78	6.57	1.47	1.23	24.77
Cranberry Twp.	4.90	8.04	3.66	4.67	3.56	2.11	26.94
Lykens Twp.	4.51	6.52	4.57	7.97	3.73	1.45	28.73
CRAWFORD Ave.	4.56	6.70	3.90	6.04	3.05	1.91	26.16
Deviation*	(+.86)	(+2.85)	(+.32)	(+3.05)	(+.11)	(-.54)	(+6.65)

Table 2

Temperature summary (degrees Fahrenheit) for Tiffin, Ohio, 1979.

TIFFIN	May	June	July	Aug.	Sept.	Oct.
1979	62.87	70.60	71.63	70.65	64.80	52.68
Deviation*	(+2.74)	(+1.09)	(-1.95)	(-.79)	(-.49)	(-.90)

*Deviations calculated using 94-year record National Weather Service data for Tiffin, Ohio. (Personal communication with Mr. R. D. Foutz).

PERFORMING DEMONSTRATION PLOTS

Plot Selection

Tentative plot locations were initially suggested by county task force members in January. Major factor influencing selection was availability of fields that had not been tilled the previous fall. Other factors considered were potential cooperators, soil suitability for reduced tillage, drainage, known problem erosion areas, field histories (weed pressure, insecticide problems, fertility) and availability of reduced tillage equipment and no-till planters. Demonstration plots were also to be adjacent to roads and accessible for viewing by the public. Using these factors as guidelines, landowners were contacted in February and March to determine final plot locations. While reduced tillage demonstration efforts were directed to more erosive areas of the watershed, factors such as equipment availability, plot accessibility and previous crop residue suitability were significant determinants of plot location. As a result many plots were in erosive areas, but others were not. In final analysis, plots selected tended to represent a variety of conditions (drainage, soils, crop residues, etc.) commonly found throughout the watershed. NOTE: Based on this initial work, the Honey Creek Joint Board did lease a Buffalo no-till slot planter for use in the watershed.

Planning

After plot locations had been selected, cooperating landowners were contacted in late March to plan demonstration plot details. Recommendations were made regarding fertility, herbicide-insecticide usage, seed varieties, and equipment to be used. (Where current soil test data was not available, fertilizer recommendations were based on previous yields, expected yields and past fertility programs.) It was further determined exactly who was to do what job and when. For example, it may have been determined that the farmer would have herbicides custom applied following planting. If necessary, times were also set to assist landowners in planter calibration. Finally, all cooperators were asked to contact project personnel before planting so that one of them or an agency representative could be present to view planting and/or assist the planting operation. Through all planning discussions, management steps required to insure a successful reduced tillage operation were emphasized. Extension Service representatives reviewed final recommendations to insure technical correctness. Extension personnel, farm service dealers/representatives and others with current information on reduced tillage also provided assistance during final plot planning.

Planting - Spraying

Upon receiving notification from a cooperator that he was ready to plant, project or other agency personnel went to the plot to assist planting and to check seeding rate and depth. In some cases project personnel drove planting equipment so farmers could observe proper operation of no-till planting units.

Most plots were custom sprayed after planting. To help insure proper herbicide application, local custom sprayers, where possible, were informed about the plots and provided written herbicide recommendations several weeks before planting.

Monitoring

Following planting, plots were checked for emergent plant populations. Amounts of past crop residues on the surface were also estimated. Throughout the growing season, insect, weed and disease conditions were checked 2 to 3 times weekly by either project staff or Extension Service representatives. Where pest problems were detected, recommendations were made to eliminate or reduce damage encountered. Near the end of the growing season, final stand populations were recorded. Photo documentation of most plots was also done.

Harvest

In order to uniformly determine net return to farmers from corn plots, yield checks were done using the method employed by Chevron Chemical Co. in their state-wide (Ohio) no-till yield contest. With this method a representative acre or more is harvested. Based then on measurements of average row width, length, number of rows, corn moisture at harvest, and total weight harvested, corn yields were calculated to 15.5% moisture. Total harvest weights from demonstration plots were determined with a weigh wagon having an electronic scale with digital readout. For soybeans the method was modified to include measurements of combine header width as compared to row width for corn. Modifications were also made to calculate bean yields at 13% moisture.

TILLAGE PLOT ECONOMICS - GUIDELINES FOR COMPARISON

During 1979 tillage demonstrations, cooperators reported quantities of fertilizer, herbicides and insecticides used per acre, and noted the number and type of operations across the field. Tables 7 and 8 show 1979 spring unit prices of materials and custom rate charges used in determining production costs. The $2.25 base price for corn was determined by averaging local elevator prices during the week of November 11, 1979. The $6.25 base price for soybeans was determined by averaging local elevator prices during the week of October 14. Crop value for corn was calculated by taking yields at 15.5% moisture, multiplying by $2.25 minus drying charges (local elevator schedule). Crop value for soybeans was calculated by taking yields at 13.0% moisture and multiplying by $6.25 minus drying charges (local elevator schedule). Return to land management was then calculated as the difference between crop value and production costs. Pages 12 to 49 provide detailed explanation and breakdown of calculations for all tillage plots.

Guidelines

1. Due to limited planning time for demonstration plots, few economic comparisons between reduced tillage and conventional tillage operations were made. More emphasis was placed on demonstration of conservation tillage practices rather than comparisons with other tillage systems.

2. Material costs for corn plots varied greatly both within and among tillage categories (no-till, reduced till, and conventional). Variations are attributed to yield goals, build up of fertility rates, previous crops, and amounts of growing vegetation present at planting time (reduced till and no-till plots). As noted in the individual economic analyses, growing vegetation within reduced or no-till plots requires additional expense for a contact herbicide ($5-$10/A), and surfactant ($.30-.90/A). Rates of residual herbicides are about the same, except higher rates were generally used to insure control under heavy residue conditions.

3. Machine costs for plots within a given tillage category were fairly consistent (Tables 5 and 6). For example, machine costs on corn plots averaged $46.37 for no-till, $53.49 for reduced tillage, and $68.77 for conventional. Machine costs for soybean plots were similar since doubling back in no-till plots for 15" rows was an added $10/acre cost. This cancelled cost benefits for reduced tillage passes. NOTE: Conventional plots on the Phenicie and Niese farms (Tables 5 and 6) are not traditional plow forms of conventional tillage, but are conventional systems compared to their normal tillage operations.

4. Nitrogen costs vary according to form in which N is applied. Anhydrous ammonia is cheaper per unit of N, but takes more time, fuel, equipment, and experienced labor to apply.

5. Cost of insecticides used in the no-till plots were slightly more than that of reduced or conventional plots. Seed treaters were used in all no-till plots but one, and higher rates of Furadan 10G were used in some plots to insure armyworm control.

6. The schedule of custom rates may differ from those in your area. The costs of owning and operating your own equipment may differ substantially. Machine custom rates includes overhead costs, machine operating costs, machine replacement, repairs, fuel, and time for the operator.

7. Timeliness of operation is not considered in any of the economic comparisons. Reduced tillage systems may enhance the timeliness of field operations. OSU Agronomists estimate that corn yields are reduced about 1 bushel per acre for every day that planting occurs after May 10. Thus reduced and no-till systems with their lower field time requirements may improve the timeliness and increase yields for your operations.

8. Costs of soil losses are not included but need important consideration. Soil loss may be a significant economic loss in your farm operation. One ton of medium textured soil is worth $6-$9 in N - P_2O_5 - K_2O alone and it's not uncommon for farms to be losing 5 tons or more soil per acre per year conventionally. Of course, this soil loss may also impose costs on others as sediment is deposited in drainage ditches, streams, and harbors, for example.

9. Fuel use was not measured in the plots or compared with other tillate systems. One must realize the tremendous fuel savings when tillage trips over a field are reduced. With the rising cost of fuel and energy, the farmer of the future will have to be an energy conservationist as well as a soil conservationist.

10. Yields will still be a main factor in determining profitability of different conservation tillage systems. With any tillage system, experience and years of practice with different growing seasons, will enable more reliable comparison of results and conclusions.

Main requirement for successful application of reduced tillage and no-till is following proper management steps. Knowledge of planting depth and seed placement in different crop residues is an important step leading to good stands.

Table 3, UNIT PRICES OF MATERIALS

Fertilizer:

Anhydrous ammonia (82%)	. . . . .	12¢/lb. actual N
Nitrogen solution (28%)	. . . . .	19.5¢/ lb. actual N
Urea (45%)	. . . . .	19.5¢/ lb. actual N
0-44-0 $145/ton or	. . . . .	16.5¢/ lb. actual P
0-0-60 $117/ton or	. . . . .	9.5¢/ lb. actual K

9-27-3+2s	$170/ton
8-25-3	$165/ton
6-18-6+2s	$139/ton
7-26-26	$160/ton
7-20-34	$153/ton
6-24-24	$152/ton
6-15-40	$147/ton
14-21-9+2z+11s	$185/ton
0-22-30	$141/ton
4-16-10	$138/ton
8-32-16	$166/ton
18-46-0	$200/ton
9-18-19	$2.80/gal.
10-10-10	$2.30/gal.
/1 Seed, lime, misc.	$35.00/acre

NOTE: Your price will vary according to season, financing, location, and discounts.

Herbicides

Roundup	$58.00/gal.	Princep 80W	$ 2.70/1b.
Paraquat 1CL	40.00/gal.	Sencor 4L	68.00/gal.
X-77 Spreader	12.00/gal.	Sencor 50W	7.90/1b.
Atrazine 4L	11.00/gal.	Lorox 50W	4.00/1b.
Sutan 6.7E	15.00/gal.	2,4-D Formula 40	7.25/gal.
Lasso 4EC	16.00/gal.	Banvel D	33.25/gal.
Bladex 4L	13.00/gal.	Basagran	64.00/gal.
Dual 6E	26.50/gal.	Citowett	8.90/gal.
Dual 8E	35.50/gal.	Crop oil	4.70/gal.

Insecticides

Seed treater	$ .50/acre	Sevin 50W	$ 1.35/1b.
Kalo Triple-Noctin L	2.00/acre	Furadan 10G	.75/1b.
		Dyfonate 20G	1.00/1b.

/1 Includes supplies, utilities, soil tests, small tools, crop insurance, etc.

Table 4, MACHINE CUSTOM RATES

Primary Tillage	Plow	$10.00/acre
	Chisel w/twisted shanks	7.50
	Chisel w/shovels	7.50
Secondary Tillage	Field cultivate	5.50
	Tandem disc	5.00
	Harogator w/packer	4.50
	Flexible disc	4.00
	Cultimulcher	4.00
Planting	No-till	10.00 /1
	Conventional	7.00
Cultivate		4.00
Rotary hoeing		2.50
Spray liquid		3.00
Spread dry fertilizer		3.00
Aerial application		4.00
Apply anhydrous ammonia		5.50
Harvest	Corn	18.00
	Soybeans	16.00
Truck grain (300+ bu. loads) (10+ mi.)		.08/bu.

/1 If no-till planter was used in seedbed where a conventional planter could operate, conventional planting rate was used.

Table 5 ECONOMIC SUMMARY (SOYBEANS)

NO-TILL

Name	Crum	Eckstein		Average
Material costs	$ 81.44	$ 77.97	. . . . .	$ 79.71
Machine costs	42.93	45.68	. . . . .	44.31
Total costs	$124.37	$123.65	. . . . .	$124.02
Return (net)	$181.52	$139.48	. . . . .	$160.50
Yield (bu.)	49.1	42.1	. . . . .	45.6

REDUCED TILL

Name	Green	Niese	Niese	Average
Material costs	$129.52	$ 79.22	$ 77.98	$ 95.57
Machine costs	39.02	45.77	45.78	43.52
Total costs	$168.54	$124.99	$123.76	$139.09
Return (net)	-$13.45	$166.09	$168.55	$107.06
Yield (bu.)	25.3	47.1	47.3	39.9

CONVENTIONAL

Name	Niese		Average
Material costs	$ 77.98	. . . . .	$ 77.98
Machine costs	49.28	. . . . .	49.28
Total costs	$127.26	. . . . .	$127.26
Return (net)	$125.51	. . . . .	$125.51
Yield (bu.)	41.0	. . . . .	41.0

NOTE: Summary of production costs and yields taken from pages 42 to 49. See individual economic analysis pages for detailed explanation of cost differences. Material cost includes seed, lime, fertilizer, herbicides and interest on operation capital. Machinery costs includes tillage, planting, harvest, trucking and application of fertilizer, herbicides, and insecticides.

Table 6 ECONOMIC SUMMARY (CORN)

NO-TILL

Name	Hoffert	Fritz	Price	Willman	Smith	Smith	Kalb	Kalb
Material costs	$116.89	$131.76	/1 $196.92	$159.19	$155.11	$155.11	$152.02	$152.02
Machine costs	40.37	43.42	48.20	43.22	41.07	42.98	44.36	42.94
Total costs	$157.26	$175.18	$245.12	$202.41	$196.18	$198.09	$196.38	$194.96
Return(net)/2	$ 96.84	$ 76.70	$ 54.32	-$36 13	-$8.77	$ 44.26	$ 67.80	$ 39.82
Yield (bu) /3	117.7	117.1	138.0	77.7	88.4	112.2	129.5	111.8

REDUCED TILL

Name	Reichert	Kalb	Kalb	Eckstein	Eckstein	Phenicie	Phenicie
Material costs	$157.85	$133.46	$133.46	$ 99.90	$ 99.90	$173.86	$168.15
Machine costs	61.12	56.10	56.00	50.71	50.31	53.99	50.97
Total costs	$218.97	$189.56	$189.46	$150.61	$150.21	$227.85	$219.12
Return (net)	$ 63.20	$ 66.04	$ 63.58	$165.61	$158.04	$ 98.93	$105.51
Yield (bu)	139.0	120.0	118.8	146.4	141.4	149.9	149.6

CONVENTIONAL

Name	Phenicie	Reichert	
Material costs	$152.74	$157.85	. . . . .
Machine costs	67.76	69.77	. . . . .
Total costs	$220.50	$227.62	. . . . .
Return (net)	$ 86.66	$ 41.78	. . . . .
Yield (bu)	140.9	134.7	. . . . .

/1 Roundup used for quackgrass eradication. While total product cost included in summary, benefits extend to future years.
/2 Average return for the 13 plots with 28% nitrogen used was $76.31.
/3 Average yield for the 13 plots with 28% nitrogen used was 134.1 bu/acre.

Table 6 ECONOMIC SUMMARY (CORN) (cont)

NO-TILL

Nedolast	Nedolast	Nedolast	Crum	Crum	Phenicie	Phenicie	Phenicie	Average
$166.49	$166.49	$166.49	$146.03	$146.03	/1 $190.56	/1 $190.56	/1 $190.56	$161.69
50.52	51.92	50.08	49.14	48.63	48.02	48.58	48.42	46.37
$217.01	$218.41	$216.57	$195.17	$194.66	$238.58	$239.14	$238.98	$207.76
$ 67.03	$101.94	$ 56.85	$129.47	$120.86	$ 54.93	$ 74.85	$ 50.70	$ 61.96
131.5	149.0	126.0	151.7	145.4	137.8	144.7	142.7	126.3

REDUCED TILL

Harer	Harer		Average
$147.73	$140.57	. . . . .	$139.43
53.86	48.33	. . . . .	53.49
$201.59	$188.90	. . . . .	$192.92
$179.10	$ 65.29	. . . . .	$107.26
185.7	116.6	. . . . .	140.8

CONVENTIONAL

	Average
. . . . .	$155.30
. . . . .	68.77
. . . . .	$224.07
. . . . .	$ 64.22
. . . . .	137.8

NOTE: Summary of production costs and yields taken from pages 12 to 41. See individual economic analysis pages for detailed explanation of cost differences. Material cost includes seed, lime, fertilizer, herbicides and interest on operation capital. Machinery costs includes tillage, planting, harvest, trucking, application of fertilizer, herbicides, insecticides, and time for operator.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Harry Hoffert, 7628 S. CR 43, Bloomville, Ohio 44818

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	21,500	22.0	117.1	$254.10	$157.26	$96.84

TILLAGE

1 Planted with an Allis-Chalmers no-till plate planter

PLOT NO.	1
Tillage treatment	No-till
TOTAL VALUE	$254.10
Seed, lime, misc.	$ 35.00
Fertilizer: Starter 250# 6-24-24	26.60
W/herbicide 34 gal. 28-0-0	27.30
Chemicals: Herbicides	21.56
Insecticides	-
Int. on operating capital, 7 mo. at 10%	6.43
TOTAL VARIABLE COSTS	$116.89
Machinery (custom rates)	
Primary tillage	-
Secondary tillage	-
Planting	$ 10.00
Cultivation	-
Spraying, spread fertilizer	3.00
Apply ammonia	-
Harvest	18.00
Trucking	9.37
TOTAL MACHINERY COSTS	$ 40.37
TOTAL COSTS	$157.26
Return to land, management	$ 96.84

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Harry Hoffert, 7628 S. CR 43, Bloomville, Ohio 44818

PLOT DETAILS

Planted Gutwein 2140 on May 8 in 30 inch rows. Intended seed drop was 25,000; of which 23,100 plants emerged in the Tiro and Bennington silt loam soil. No tile drainage present. 1978 crop was soybeans. 350# of 6-24-24 was applied next to row and 100# of N was applied as 28% with a total N-P-K as follows: 121-84-84. 1 pt. Paraquat CL w/16 oz. X-77 spreader/100 gal. 28%, 3 qt. Atrazine 4L and 2 qt. Lasso 4L were applied before planting with the 28%. Good weed control but some nutsedge and foxtail not controlled. Some European corn borer damage. Harvested November 13.

No-till corn after soybeans. About 1100 lbs. of bean residue per acre reduce erosion, retain moisture & aid stand establishment.

1979 TILLAGE COMPARISON CULTURAL &ECONOMIC DATA

Mark Fritz, Box 72, Rt. 2, Attica, Ohio 44807

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND MGT.
1	No-till	Corn	21,000	23.75	117.7	$251.88	$175.18	$76.70

TILLAGE

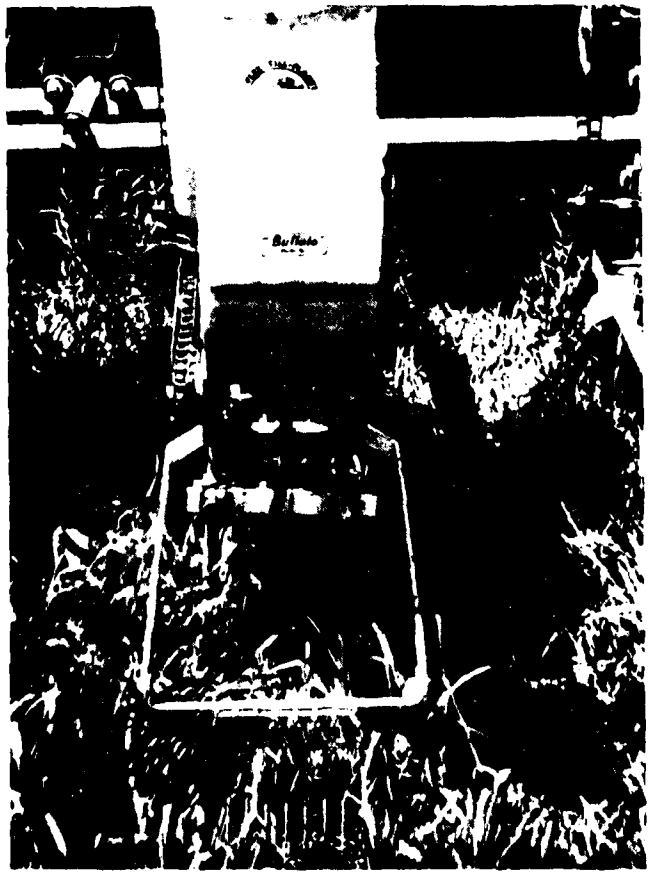
1 Planted with a Buffalo no-till slot planter.

PLOT NO.		1
Tillage treatment		No-till
TOTAL VALUE		$251.88
Seed, lime, misc.		$ 35.00
Fertilizer:	Starter 225# 10-21-31	17.69
	W/herbicide 60 gal. 28-0-0	34.73
Chemicals:	Herbicides	26.08
	Insecticides	11.00
Int. on operating capital, 7 mo. at 10%		7.26
TOTAL VARIABLE COSTS		$131.76
Machinery (custom rates)		
	Primary tillage	-
	Secondary tillage	-
	Planting	$ 10.00
	Cultivation	-
	Spraying, spread fertilizer	6.00
	Apply ammonia	-
	Harvest	18.00
	Trucking	9.42
TOTAL MACHINERY COSTS		$ 43.42
TOTAL COSTS		$175.18
Return to land, management		$ 76.70

Mark Fritz, Box 72, Rt. 2, Attica, Ohio 44807

PLOT DETAILS

Planted Pioneer 3780 on May 18 in 30-inch rows. Intended seed drop was 29,550; of which 21,500 plants emerged in the Cardington, Bennington silt loam, Marengo silty clay loam soil. Problem in getting good consistant seed coverage with the planter used in this type situation. 1978 crop was alfalfa timothy sod. Tile drainage is systematic. 225# of a blended 10-21-31 was applied next to row. 178# N applied as 28%, with total N-P-K applied as follows: 201-47-71. 1/2# 2,4-D Amine and 1/8# Banvel D was applied 10 days prior to planting. 1 qt. Paraquat CL with 16 oz. X-77 spreader/100 gal. 28%, 2 qt. Bladex 4L, 2.5 qt. Atrex 4L applied with the 28% just after planting. Grass control good except some breakthrough of nutsedge and fall panicum. Broadleaf control excellent. 14# Furadan 10G incorporated by planter above furrow and Isotox "F" seed treater used. No insect problems. Harvested November 3.



Planting no-till corn in alfalfa-timothy sod. Proper surface soil moisture at planting helps insure good stands under this cover condition.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Paul Price, 6236 S. Twp. Rd. 173, Bloomville, Ohio 44818

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	26,700	21.55	138.0	$299.46	$245.12	$54.32

TILLAGE

1 Planted with a John Deere 7000 Conservation Tillage planter.

PLOT NO.		1
Tillage treatment		No-till
TOTAL VALUE		$299.46
Seed, lime, misc.		$ 35.00
Fertilizer:	Broadcast - 600# 7-26-26	48.00
	Starter - 240# 9-27-3+2s	20.40
	W/herb. - 53 gal. 28-0-0	30.67
Chemicals:	Herbicides	41.00 /1
	Insecticides	11.00
Int. on operating capital, 7 mo. at 10%		10.85
TOTAL VARIABLE COSTS		$196.92
Machinery (custom rates)		
	Primary tillage	-
	Secondary tillage	-
	Planting	$ 10.00
	Cultivation	-
	Spraying, spread fertilizer	9.00
	Apply ammonia	-
	Harvest	18.00
	Trucking	11.20
TOTAL MACHINERY COSTS		$ 48.20
TOTAL COSTS		$245.12
Return to land, management		$ 54.32

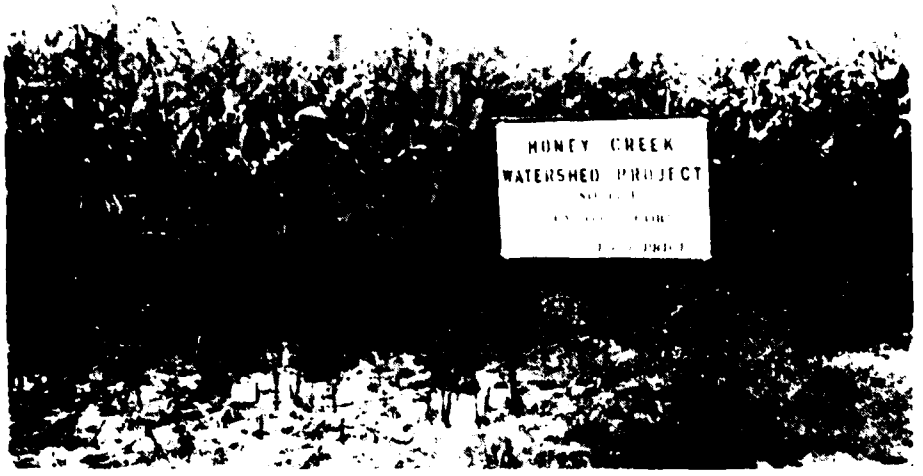
/1 If 1 pt. Paraquat 2 CL and X-77 spreader could have been used for 2 qt. Roundup 4 EC, herbicide costs would be $17.75. See plot details next page.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC

Paul Price, 6236 S. Twp. Rd. 173, Bloomville, Ohio 44818

PLOT DETAILS

Planted Funks 4323 on May 18 in 30-inch rows. Intended seed drop was 30,200; of which 27,800 plants emerged in the Tiro, Randolph, Channahon silt loam soils. No tile drainage present. 1978 crop was corn. 600# of 7-26-26 was broadcasted after corn emerged, slightly burning the plants. 240# (21 gal.) of 9-27-3+2s was applied next to the row. 157# of N was applied as 28%, with total N-P-K applied as follows: 221-196-139+5s. 2 qt. Roundup 4EC was applied 8 days prior to planting to eradicate quackgrass and Canada thistle. 2 qt. Aatrex 4L and 3 qt. Bladex 4L were applied just after planting with the 28%. Grass and broadleaf control was excellent. 14# Furadan 10G applied in the furrow and Isotox "F" seed treater used. No insect problems. Harvested November 21.



Dave Wurm, Project Conservationist, checking no-till corn stand on the Paul Price farm. Special Honey Creek cost share monies through the Agricultural Stabilization and Conservation Service assisted completion of this plot.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Dick Willman, 13974 E. TR 104, Attica, Ohio 44807

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	23,650	23.65	77.7	$166.28	$202.41	-$36.13

TILLAGE

1 Planted with a John Deere 7000 conservation tillage planter

PLOT NO.	1
Tillage treatment	No-till
TOTAL VALUE	$166.28
Seed, lime, misc	$ 35.00
Fertilizer: Broadcast 400# 6-15-40	29.40
Broadcast 300# 45-0-0) 100# 0-0-60)	32.03
Starter 20 gal. 8-25-3	18.56
Chemicals: Herbicides	23.68
Insecticides	11.75
Int. on operating capital, 7 mo. at 10%	8.77
TOTAL VARIABLE COSTS	$159.19
Machinery (custom rates)	
Primary tillage	-
Secondary tillage	-
Planting	$ 10.00
Cultivation	-
Spraying, spread fertilizer	9.00
Apply ammonia	-
Harvest	18.00
Trucking	6.22
TOTAL MACHINERY COSTS	$ 43.22
TOTAL COSTS	$202.41
Return to land, management	-$ 36.13

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Dick Willman, 13974 E. TR 104, Attica, Ohio 44807

PLOT DETAILS

Planted Pioneer 3780 on May 11 in 30 inch rows. Intended seed drop was 27,700; of which 24,500 plants emerged in the Blount silt loam soil. Tile drainage is very random in lows. 1978 crop was wheat with a clover plowdown mixture seeded. Early in spring 400# of a blended 6-15-40 was broadcasted. Just before planting a blend of 300# 45-0-0 and 100# 0-0-60 was applied on the surface. 20 gal. 8-25-3 was applied next to row with a total N-P-K as follows: 177-126-227. 1 qt. Paraquat CL with X-77 spreader at 8 oz./100 gal. water, 2 qt. Bladex 4L, and 2.5 qt. Aatrex 4L were applied just after planting using 40 gal. water/acre as carrier. Throughout the growing season the effects of probable denitrification and/or volatilization of urea could be observed. These effects included: yellowing of the corn plants; the burning back of the leaves in a "V" shape; and very short ears pinched at the tips with very hard, round, small, shiny kernals. Factors related to this loss of nitrogen in this situation could have one or more of the following: warm weather above 55°F at time of urea application; soil surface with a high pH (above 6.5); the failure to get a rain soon after application; the physical obstruction of the clover residue not letting the urea get to the soil surface; and the chemical instability and volatility of urea. Excellent grass and broadleaf control. Isotox "F" seed treater and 15# Furadan 10G was applied in the furrow at planting. No insect problems. Harvested November 15.

No-till corn after wheat with clover. Good stands are the first thing a farmer wants to see when using no-till.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Bill Smith, 10685 E. Twp. Rd. 108, Attica, Ohio 44807

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND MGT.
1	No-till	Corn	25,700	24.87	88.4	$187.41	$196.18	-$8.77
2	No-till	Corn	26,300	22.85	112.2	242.35	198.09	44.26

TILLAGE

1 Planted Dekalb XL42 with John Deere 7000 Conservation tillage planter.
2 Planted Pioneer 3780 with John Deere 7000 Conservation tillage planter.

PLOT NO.		1	2
Tillage treatment		No-till	No-till
TOTAL VALUE		$187.41	$242.35
Seed, lime, misc.		$ 35.00	$ 35.00
Fertilizer:	Broadcast - 800# 25-15-15	67.45	67.45
	Starter - 10 gal. 9-27-3+2s	9.72	9.72
Chemicals:	Herbicides	22.64	22.64
	Insecticides	11.75	11.75
Int. on operating capital, 7 mo. at 10%		8.55	8.55
TOTAL VARIABLE COSTS		$155.11	$155.11
Machinery (custom rates)			
	Primary tillage	-	-
	Secondary tillage	-	-
	Planting	$ 10.00	$ 10.00
	Cultivation	-	-
	Spraying, spread fertilizer	6.00	6.00
	Apply ammonia	-	-
	Harvest	18.00	18.00
	Trucking	7.07	8.98
TOTAL MACHINERY COSTS		$ 41.07	$ 42.98
TOTAL COSTS		$196.18	$198.09
Return to land, management		-$8.77	$ 44.26

Bill Smith, 1068 E. Twp. Rd. 598, Attica, Ohio 44807

PLOT DETAILS

Planted Dekalb XL-42, Plot #1, and Pioneer 3780, Plot #2, in 30-inch rows. Intended seed drop was 29,000; of which 26,600 plants of the Dekalb and 27,800 plants of the Pioneer 3780 emerged in the Blount silt loam soil. Tile drainage is systematic. 1978 crop was wheat with a clover plowdown mixture seeded. A few days before planting 800# of a blended ratio 25-15-15 fertilizer was broadcasted on the surface. 10 gal. 9-27-3+2s were applied next to row with a total N-P-K as follows: 210-150-124. 1 qt. Paraquat CL w/8 oz. X-77 Spreader/100 gal. water, 1.5 qt. Atrex 4L and 2.5 qt. Bladex 4L were applied just after planting using 40 gal. water/acre as carrier. Throughout the growing season the effects of probable denitrification and/or volatilization of urea could be observed. These effects included: yellowing of the corn plants; the burning back of the leaves in a "V" shape; and very short ears pinched at the tips with very hard, round, small, shiny kernels. Factors related to this loss of nitrogen in this situation could have been one or more of the following: warm weather above 55°F at time of urea application; soil surface with a high pH (above 6.5); the failure to get a rain soon after application; the physical obstruction of the clover residue not letting the urea get to the soil surface; and the chemical instability and volatility of urea. Excellent grass and broadleaf control except a few giant foxtail. Diazinon seed treater and 15# Furadan 10G were applied at planting in furrow. No insect problems. Harvested November 3.

No-till corn after wheat with clover. Here 1300 lbs. of crop residue covers 94% of the soil surface to reduce erosion.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Jason Kalb, 6010 Vorndron Rd., New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN LAND, MGT.
1	No-till	Corn	26,650	29.4	129.5	$264.18	$196.38	$67.80
2	No-till	Corn	25,900	25.9	111.8	234.78	194.96	39.82

TILLAGE

1 Planted Pioneer 3518 with an Allis Chalmers No-till plate planter
2 Planted Pioneer 3780 with an Allis Chalmers No-till plate planter

PLOT NO.		1	2
Tillage treatment		No-till	No-till
TOTAL VALUE		$264.18	$234.78
Seed, lime, misc.		$ 35.00	$ 35.00
Fertilizer:	Broadcast 100# 0-0-60	5.70	5.70
	Starter 25 gal. 9-27-3	24.29	24.29
	W/herbicide 71 gal. 28-0-0	40.95	40.95
Chemicals:	Herbicides	25.95	25.95
	Insecticides	11.75	11.75
Int. on operating capital, 7 mo. at 10%		8.38	8.38
TOTAL VARIABLE COSTS		$152.02	$152.02
Machinery (custom rates)			
	Primary tillage	-	-
	Secondary tillage	-	-
	Planting	$ 10.00	$ 10.00
	Cultivation	-	-
	Spraying, spread fertilizer	6.00	6.00
	Apply ammonia	-	-
	Harvest	18.00	18.00
	Trucking	10.36	8.94
TOTAL MACHINERY COSTS		$ 44.36	$ 42.94
TOTAL COSTS		$196.38	$194.96
Return to land, management		$ 67.80	$ 39.82

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Jason Kalb, 6010 Vorndron Rd., New Washington, Ohio 44854

PLOT DETAILS

Planted Pioneer 3518 in plot #1 and Pioneer 3780 in plot #2 on May 9 in 30 inch rows. Except for seed variety both plots were the same. Intended seed drop was 30,000; of which 27,800 plants emerged in plot #1 and 27,000 emerged in plot #2, in the Shoals, Bennington, and Cardington silt loam soils. No tile drainage present. 1978 crop was corn. 100# 0-0-60 broadcasted in the fall. 285# (25 gal.) 9-27-3 applied next to the row. 210# N was applied as 28% for a total N-P-K as follows: 201-72-68. 1.5 pt. Paraquat CL with X-77 spreader at 16 oz./100 gal. 28%, 1.5 qt. Aatrex 4L and 2 qt. Dual 6E were applied with the 28% just after planting. Excellent grass and broadleaf control. Isotox "F" seed treater and 15# Furadan 10G applied in the furrow at planting. No insect problems. Harvested October 25.

No-till corn after corn. Only small bands of soil are tilled when using a "no-till" planter. This creates a good seedbed for corn and a poor one for weeds.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Jim and Gerald Nedolast, 6496 Wynn Rd., New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	26,850	22.3	131.5	$284.04	$217.01	$67.03
2	No-till	Corn	25,750	23.5	149.0	320.35	218.41	101.94
3	No-till	Corn	27,200	21.7	126.0	273.42	216.57	56.85

TILLAGE

1 Planted Select Seeds 3100 with Allis Chalmers no-till plate planter
2 Planted Select Seeds 3300 with Allis Chalmers no-till plate planter
3 Planted Pioneer 3780 with Allis Chalmers no-till plate planter

PLOT NO.		1	2	3
Tillage treatment		No-till	No-till	No-till
TOTAL VALUE		$284.04	$320.35	$273.42
Seed, lime, misc.		$ 35.00	$ 35.00	$ 35.00
Fertilizer:	Broadcast 100# 0-0-60	5.70	5.70	5.70
	Starter 13 gal. 9-19-9	36.40	36.40	36.40
	W/herbicide 47 gal. 28-0-0	27.30	27.30	27.30
	Foliar 7 gal. 10-10-10	16.10	16.10	16.10
Chemicals:	Herbicides	25.06	25.06	25.06
	Insecticides	11.75	11.75	11.75
Int. on operating capital, 7 mo. at 10%		9.18	9.18	9.18
TOTAL VARIABLE COSTS		$166.49	$166.49	$166.49
Machinery (custom rates)				
	Primary tillage	-	-	-
	Secondary tillage	-	-	-
	Planting	$ 10.00	$ 10.00	$ 10.00
	Cultivation	-	-	-
	Spraying, spread fertilizer	12.00	12.00	12.00
	Apply ammonia	-	-	-
	Harvest	18.00	18.00	18.00
	Trucking	10.52	11.92	10.08
TOTAL MACHINERY COSTS		$ 50.52	$ 51.92	$ 50.08
TOTAL COSTS		$217.01	$218.41	$216.57
Return to land, management		$ 67.03	$101.94	$ 56.85

1979 [illegible] DATA

Jim & Gerald Nedolast, [illegible], New Washington, Ohio 44854

PLOT DETAILS

Planted Select Seeds 3100, 3320, and Pioneer 3780 on May 10 in 30 inch rows. Intended seed drop for the three plots was 29,000; of which 28,370, 28,660 and 28,760 plants emerged in the Tonawee silty loam soil. (Seed drop greater than anticipated by planter manual.) Tile drainage is generally systematic on about 100' spacing. 1978 crop was wheat with clover plowdown mixture seeded. 100# 0-0-60 was broadcasted in the spring. 13 gal. 9-18-9 was applied in the row. 150# N was applied as 28%. Foliar application of 7 gal. 10-10-10 was applied on June 26. The total N-P-K applied as follows: 160.5-33.5-80.5. 1 qt. Paraquat CL with 16 oz. X-77 spreader/100 gal. 28", 1.8 qt. Aatrex 4L, 2.4# Bladex 4L were applied with the 28" just after planting. 3/8 pt. Banvel D was applied post emergence for canada thistle. Grass and broadleaf control was excellent. 15# Furadan 10G banded and Isotox "F" seed treater used. No insect problems. Harvested October 31.

Proper planter adjustment before planting is a must when planting no-till. Consistant planting depth, adequate coverage, and good seed to soil contact are important ingredients for good stands.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Donald Crum, 5473 New Haven Rd., Shelby, Ohio 44875

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	29,850	23.95	151.7	$324.64	$195.17	$129.47
2	No-till	Corn	29,000	20.90	145.4	315.52	194.66	120.86

TILLAGE

1 Planted Pioneer 3518 with Buffalo no-till slot planter
2 Planted Pioneer 3780 with Buffalo no-till slot planter

PLOT NO.		1	2
Tillage treatment		No-till	No-till
TOTAL VALUE		$324.64	$315.52
Seed, lime, misc.		$ 35.00	$ 35.00
Fertilizer:	Broadcast 123#N-28#P-74#K	35.64	35.64
	Starter - 200# 18-32-16	16.60	16.60
	Boardcast 25 gal. 28-0-0	14.62	14.62
Chemicals:	Herbicides	24.37	24.37
	Insecticides	11.75	11.75
Int. on operating capital, 7 mo. at 10%		8.05	8.05
TOTAL VARIABLE COSTS		$146.03	$146.03
Machinery (custom rates)			
	Primary tillage	-	-
	Secondary tillage	-	-
	Planting	$ 10.00	$ 10.00
	Cultivation	-	-
	Spraying, spread fertilizer	9.00	9.00
	Apply ammonia	-	-
	Harvest	18.00	18.00
	Trucking	12.14	11.63
TOTAL MACHINERY COSTS		$ 49.14	$ 48.63
TOTAL COSTS		$195.17	$194.66
Return to land, management		$129.47	$120.86

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Donald Crum, 5473 New Haven Rd., Shelby, Ohio 44875

PLOT DETAILS

Planted Pioneer 3518 in plot #1 and Pioneer 3780 in plot #2, on May 7 in 30 inch rows. Except for seed variety both plots were the same. Intended seed drop was 29,950; of which 29,925 plants emerged in plot #1 and 29,050 in plot #2, in the Pewamo silty clay loam and Alexandria, Cardington, Bennington silt loam soils. Tile drainage is random in lows. 1978 crop was corn. 123#N, 28#P and 74#K were broadcasted in the spring with a blended fertilizer. 200# 8-32-16 was applied next to row, and 25 gal. 28% was applied after planting, with a total N-P-K as follows: 214-92-106. 1 pt. Paraquat CL with X-77 spreader at 8 oz./100 gal. water, 1.5 qt. Aatrex 4L and 3 pt. Dual 6E were applied after planting using 40 gal. water/acre as carrier. Excellent grass and broadleaf control. Isotox "F" seed treater and 15# Furadan 10G incorporated above the furrow at planting. No insect problems. Harvested November 8.

No-till corn after corn. No-till corn looks just like any other corn once the stand begins maturing. Where storms have caused erosion after planting, no-till stands may appear better than conventional.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Don Phenicie, 5661 Stevens Rd., New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND MGT.
1	No-till	Corn	27,600	24.50	137.8	$293.51	$238.58	$54.93
2	No-till	Corn	27,250	21.45	144.7	313.99	239.14	74.85
3	No-till	Corn	23,450	29.70	142.7	289.68	238.98	50.70
4	Fall chisel	Corn	25,950	20.70	140.9	307.16	220.50	86.66

TILLAGE

1 Planted Pioneer 3518 with an Allis Chalmers 333 no-till air planter
2 Planted Pioneer 3780 with an Allis Chalmers 333 no-till air planter
3 Planted Landmark 747X with an Allis Chalmers 333 no-till air planter
3 Fall chisel-tandem disc, field cultivator, cultimulch, planted Pioneer 3780 with same planter

PLOT NO.		1	2	3	4
Tillage treatment		No-till	No-till	No-till	Fall chisel
TOTAL VALUE		$293.51	$313.99	$289.68	$307.16
Seed, lime, misc		$ 35.00	$ 35.00	$ 35.00	$ 35.00
Fertilizer:	Broadcast 300# 0-0-60) 200# 0-44-0)	31.62	31.62	31.62	31.62
	Starter 225# 14-21-9+2z+11s	20.81	20.81	20.81	20.81
	Nitrogen applied as 28-0-0	39.00	39.00	39.00	7.80
	Nitrogen applied as 82-0-0	-	-	-	24.00
Chemicals:	Herbicides	42.63/1	42.63/1	42.63/1	19.09
	Insecticides	11.00	11.00	11.00	6.00
Int. on operating capital, 7 mo. at 10%		10.50	10.50	10.50	8.42
TOTAL VARIABLE COSTS		$190.56	$190.56	$190.56	$152.74
Machinery (custom rates)					
	Primary tillage	-	-	-	7.50
	Secondary tillage	-	-	-	15.50
	Planting	$ 10.00	$ 10.00	$ 10.00	7.00
	Cultivation	-	-	-	-
	Spraying, spread fertilizer	9.00	9.00	9.00	3.00
	Apply ammonia	-	-	-	5.50
	Harvest	18.00	18.00	18.00	18.00
	Trucking	11.02	11.58	11.42	11.26
TOTAL MACHINERY COSTS		$ 48.02	$ 48.58	$ 48.42	$ 67.76
TOTAL COSTS		$238.58	$239.14	$238.98	$220.50
Return to land, management		$ 54.93	$ 74.85	$ 50.70	$ 86.66

/1 If 1 qt. Paraquat CL and X-77 spreader could have been used for 2 qt. Roundup 4EC, herbicide cost would be $24.57. See plot details next page.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Don Phenicie, 5661 Stevens Rd., New Washington, Ohio 44854

PLOT DETAILS

Planted no-till corn in three plots with the varieties as follows: Plot #1 was Pioneer 3518, plot #2 was Pioneer 3780, and plot #3 was Landmark 747X. Plot #4 was fall chiselled plus secondary tillage and planted to Pioneer 3780. All plots were planted on May 7 in 30 inch rows, with same planter, on Bennington and Cardington silt loam soils. Tile drainage is systematic. 1978 crop was wheat with a clover plow-down mixture seeded. On all plots a blend of 300# 0-0-60 and 200# 0-44-0 was broadcasted in the fall. 225# 14-21-9+2z+11s was applied next to the row. In the no-till plots 200# N was applied as 28%. In the fall chiselled plot 160# N was applied as anhydrous (82%) and 40# N was applied as 28% with a total N-P-K on all plots as follows: 231.5-135-200. No-till plots received 2 qt. Roundup 4EC 6 days prior to planting to eradicate quackgrass. 2 qt. Aatrex 4L and 2.5 qt. Bladex 4L were applied just after planting with the 28%. Spot treatment with 1/2 pt. Banvel D post emerge. Fall chiselled plot #4 had 3.5 pt. Dual 6E and 2 qt. Sutan 6.7E incorporated. Excellent grass and broadlead control on all plots except for poor control of fall panicum in the no-till plots. Diazinon seed treater and 14# Furadan 10G banded on plots #1, #2, and #3, while 6# Dyfonate 20G was banded on plot #4. No insect problems. Harvested November 6.

In reduced tillage and no-till, herbicides must do the entire weed control job. Selecting proper herbicides and applying them in uniform rates across the field is essential. A herbicide is only as good as it's application.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Rich Reichert, Rt. 2, Attica, Ohio 44807

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	Spring field cultivated	Corn	28,700	30.00	139.0	$282.17	$218.97	$63.20
2	Fall plow	Corn	28,200	31.33	134.7	269.40	227.62	41.78

TILLAGE

1 Field cultivated with drag - 2x, planted with John Deere 7000 conventional planter
2 Fall plow, tandem disc with cultipacker - 2x, planted with same planter

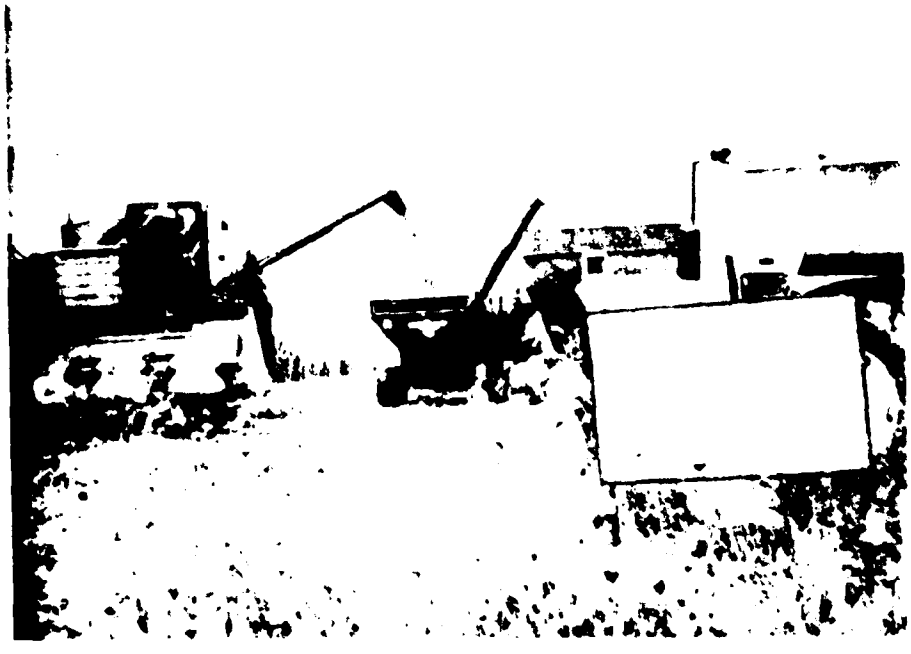
PLOT NO.		1	2
Tillage treatment		Spring cult.	Fall plow
TOTAL VALUE		$282.17	$269.40
Seed, lime, misc		$ 35.00	$ 35.00
Fertilizer:	Broadcast 200# 18-46-0) 300# 0-0-60)	37.55	37.55
	Starter 200# 8-32-16	16.60	16.60
	W/herbicide 50 gal. 28-0-0	29.25	29.25
Chemicals:	Herbicides	13.50	13.50
	Insecticides	17.25	17.25
Int. on operating capital, 7 mo. at 10%		8.70	8.70
TOTAL VARIABLE COSTS		$157.85	$157.85
Machinery (custom rates)			
	Primary tillage	-	$ 10.00
	Secondary tillage	$ 11.00	10.00
	Planting	7.00	7.00
	Cultivation	4.00	4.00
	Spraying, spread fertilizer	6.00	6.00
	Apply ammonia	-	-
	Aerial application	4.00	4.00
	Harvest	18.00	18.00
	Trucking	11.12	10.77
TOTAL MACHINERY COSTS		$ 61.12	$ 69.77
TOTAL COSTS		$218.97	$227.62
Return to land, management		$ 63.20	$ 41.78

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Rich Reichert, Rt. 2, Attica, Ohio 44808

PLOT DETAILS

Planted Dekalb XL23 on May 2 in 36 inch rows on both plots. Intended seed drop was 25,000; of which 30,600 plants emerged in the spring field cultivated plot, and 29,950 emerged in the fall plow plot. (Planter dropped more seed than anticipated.) Soil in both plots is Blount silt loam with systematic tile drainage. 1978 crop was soybeans. A blend of 200# 18-46-0 and 300# 0-0-60 was broadcasted in the spring on both plots, as well as 200# 8-32-16 next to the row. 150# N was applied as 28% with a total N-P-K applied as follows: 202-156-212. 2 qt. Lasso 4EC and 2 qt. Atrazine 4L were applied with the 28%. Broadleaf and grass control was excellent in both plots. 13# Furadan 10G was banded at planting. European Corn Borer problem in both plots, treated with 10# Furadan 10G by plane first week of July. Harvest earlier than normal because of this damage, on October 17.



No-till is not the only option when considering benefits of reduced tillage. If done properly, various types of reduced tillage practices can provide time, energy and erosion benefits while still maintaining or improving yields.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Jason Kalb, 6610 Vorndron Rd., New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	Fall chisel	Corn	28,850	24.06	120.0	$255.60	$189.56	$66.04
2	Fall chisel	Corn	26,700	24.10	118.8	253.04	189.46	63.58

TILLAGE

1 Fall chisel - tandem disc, planted with Allis Chalmers no-till plate planter
2 Fall chisel - tandem disc, planted with Allis Chalmers no-till plate planter

PLOT NO.	1	2
Tillage treatment	Fall chisel	Fall chisel
TOTAL VALUE	$255.60	$253.04
Seed, lime, misc.	$ 35.00	$ 35.00
Fertilizer: Broadcast 125# 0-0-60	7.31	7.31
Starter 25 gal. 9-27-3	24.29	24.29
W/herbicide 55 gal. 28-0-0	31.79	31.79
Chemicals: Herbicides	17.96	17.96
Insecticides	9.75	9.75
Int. on operating capital, 7 mo. at 10%	7.36	7.36
TOTAL VARIABLE COSTS	$133.46	$133.46
Machinery (custom rates)		
Primary tillage	$ 7.50	$ 7.50
Secondary tillage	5.00	5.00
Planting	10.00	10.00
Cultivation	-	-
Spraying, spread fertilizer	6.00	6.00
Apply ammonia	-	-
Harvest	18.00	18.00
Trucking	9.60	9.50
TOTAL MACHINERY COSTS	$ 56.10	$ 56.00
TOTAL COSTS	$189.56	$189.46
Return to land, management	$ 66.04	$ 63.58

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Jason Kalb, 6010 Vorndron Rd., New Washington, Ohio 44854

PLOT DATA

Planted Pioneer 3518 in two plots on May 8 in 30 inch rows. Treatments to both plots were the same. Intended seed drop was 30,000; of which 29,100 plants emerged in plot #1 and 28,050 emerged in plot #2, in the Bennington, Cardington silt loam soils. No tile drainage present. 1978 crop was corn. 125# 0-0-60 was broadcasted in the spring. 285# (25 gal.) 9-27-3 applied next to the row. 163# N was applied with 55 gal. 28% for a total N-P-K as follows: 187-72-73. 1 pt. Paraquat CL with X-77 spreader at 16 oz./100 gal. 28%, 1.5 qt. Aatrex 4L and 2 qt. Lasso 4EC were applied just after planting with the 28%. Excellent grass and broadleaf control. 13# Furadan 10G banded at planting. No insect problems. Harvested November 8.

This reduced tillage corn plot contained 2000 pounds of previous crop residue covering about 44% of the soil surface at planting time. This residue helped prevent surface compaction and cracking through the growing season without cultivation.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Ross Eckstein, 6521 Johnston Rd., New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	Spring field cultivated	Corn	22,800	23.00	146.4	$316.22	$150.61	$165.61
2	Spring field cultivated	Corn	22,650	20.40	141.4	308.25	150.21	158.05

TILLAGE

1 Field cultivated, planted Pioneer 3518 with Ford conventional plate planter
2 Field cultivated, planted Pioneer 3780 with Ford conventional plate planter

PLOT NO.	1	2
Tillage treatment	Field Cult.	Field cult.
TOTAL VALUE	$316.22	$308.25
Seed, lime, misc.	$ 35.00	$ 35.00
Fertilizer: Anhydrous applied 175# N	21.00	21.00
Starter 320# 6-24-24	24.32	24.32
Chemicals: Herbicides	14.07	14.07
Insecticides	-	-
Int. on operating capital, 7 mo. at 10%	5.51	5.51
TOTAL VARIABLE COSTS	$ 99.90	$ 99.90
Machinery (custom rates)		
Primary tillage	-	-
Secondary tillage	$ 5.50	$ 5.50
Planting	7.00	7.00
Cultivation	-	-
Spraying, spread fertilizer	3.00	3.00
Apply ammonia	5.50	5.50
Harvest	18.00	18.00
Trucking	11.71	11.31
TOTAL MACHINERY COSTS	$ 50.71	$ 50.31
TOTAL COSTS	$150.61	$150.21
Return to land, management	$165.61	$158.04

19[illegible]

Ross Eckstein, 6[illegible]

PLOT DETAILS

Planted Pioneer 3518 in [illegible] in plot #2 in 30 inch rows. Except for [illegible] were the same. Intended seed drop was 28,000; [illegible] emerged in plot #1 and 23,600 emerged in [illegible] loam and Bennington, Cardington silt loam soil[illegible] was applied as anhydrous ammonia a few days prior to [illegible] was applied next to row for a total N-P-K as [illegible]. 1.5 qt. Aatrex 4L and 3 pt. Dual 6E were applied [illegible] planting. Excellent grass and broadleaf control. No insect problems. Harvested November 7.

When changing to reduced or no-tillage farming, you must [illegible] certain that the changes made will work. Checking seed drop, planting depth and seed soil contact after planting are good ways to begin [illegible] uncertainty or familiarity with [illegible] practice.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Don Phenicie, 5661 Stevens Rd., New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND MGT.
1	Fall disc-plant	Corn	25,500	28.80	149.9	$326.78	$227.85	$98.93
2	Fall disc-plant	Corn	27,050	21.35	149.6	324.63	219.12	105.51

TILLAGE

1 Fall disc - planted with an Allis Chalmers 333 no-till air planter
2 Fall disc - planted with a Buffalo no-till slot planter

PLOT NO.	1	2
Tillage treatment	Fall disc	Fall disc
TOTAL VALUE	$326.78	$324.63
Seed, lime, misc.	$ 35.00	$ 35.00
Fertilizer: Broadcast 300# 0-0-60) - 200# 0-44-0)	31.62	31.62
Starter 225# 14-21-9+2z+11s	20.81	20.80
W/herbicide 67 gal. 28-0-0	39.00	39.00
Chemicals: Herbicides	21.45	21.45
Insecticides	16.40	11.00
Int. on operating capital, 7 mo. at 10%	9.58	9.27
TOTAL VARIABLE COSTS	$173.86	$168.15
Machinery (custom rates)		
Primary tillage	-	-
Secondary tillage	$ 5.00	$ 5.00
Planting	10.00	10.00
Cultivation	-	-
Spraying, spread fertilizer	9.00	6.00
Apply ammonia	-	-
Harvest	18.00	18.00
Trucking	11.99	11.97
TOTAL MACHINERY COSTS	$ 53.99	$ 50.97
TOTAL COSTS	$227.85	$219.12
Return to land, management	$ 98.93	$105.51

Don Phenicie, 5661 Stevens Rd., New Washington, Ohio 44854

PLOT DETAILS

Planted Pioneer 3780 on May 7 in 30 inch rows with two different planters: plot #1 - Allis Chalmers; plot #2 - Buffalo. Intended seed drop was 30,000; of which 28,000 plants emerged in plot #1, and 27,880 plants emerged in plot #2, in Bennington and Ekkens silt loam soils. Tile drainage was systematic. 1978 crop was corn. On both plots a blend of 300# 0-0-60 and 200# 0-44-0 was broadcasted in the fall. 225# of 14-21-9+2z+11s was applied next to the row. 200# was applied as 28%, with a total N-P-K as follows: 231.5-137-200. 1 pt. Paraquat CL with X-77 spreader at 16 oz./100 gal. 28%, 3 pt. Dual 6E and 2 qt. Aatrex 4L were applied on both plots just after planting with the 28%. Spot treatment with 1/2 pt. Banvel D post emerge. Excellent grass and broadleaf control except for some fall panicum. Diazinon seed treater and 14# Furadan 10G applied on both plots. No insect problems except plot #1 was treated with 4# Sevin 50 WP in June for cutworms. This damage could be seen in final population counts as shown on the previous page. Harvested November 6.

Planting reduced till corn after corn with the Buffalo slot planter. A variety of planters were used to plant demonstration plots. When adjusted properly for field conditions, they all did an excellent job.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Ed and Dick Harer, 7487 Kennedy Rd., Bloomville, Ohio 44818

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND MGT.
1	Fall disc-plant	Corn	22,900	28.75	185.7	$380.69	$201.59	$179.10

TILLAGE

1 Fall tandem disc - planted with John Deere 7000 conservation tillage planter

PLOT NO.	1
Tillage treatment	Disc-plant
TOTAL VALUE	$380.69
Seed, lime, misc.	$ 35.00
Fertilizer: Broadcast 300# 6-15-40	22.05
Starter 21 gal. 9-27-3+2s	20.40
W/herbicide 60 gal. 28-0-0	34.71
Chemicals: Herbicides	16.43
Insecticides	11.00
Int. on operating capital, 7 mo. at 10%	8.14
TOTAL VARIABLE COSTS	$147.73
Machinery (custom rates)	
Primary tillage	-
Secondary tillage	$ 5.00
Planting	10.00
Cultivation	-
Spraying, spread fertilizer	6.00
Apply ammonia	-
Harvest	18.00
Trucking	14.86
TOTAL MACHINERY COSTS	$ 53.86
TOTAL COSTS	$201.59
Return to land, management	$179.10

Ed and Dick Harer, [illegible] Kennedy Rd., Bloomville, Ohio 44818

PLOT DETAILS

Planted Trojan 115A on May [illegible] in 30 inch rows. Intended seed drop was 26,100; of which 23,500 plants emerged in the Condit silt loam soil. Tile drainage is [illegible]. [illegible] crop was soybeans. 300# 6-15-40 was broadcasted in the fall. 200# (21 gal.) 9-27-3+2s was applied next to the row. 12# N was applied with 60 gal. 28%, for a total N-P-K as follows: 218-119-12 +5s. 2 qt. Aatrex 4L and 3.3 pt. Dual 6E were applied after planting. Excellent grass and broadleaf control. Heptachlor seed treater used and 14# Furadan 10G was applied in the furrow. No insect problems. Harvested October 26.

Ultimate success of reduced tillage is usually measured in terms of crop yield. Here Project Conservationist Dave Wurm helps Dick and Ed Harer check moisture on their 18[illegible] bu/ac corn.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Ed and Dick Harer, 7487 Kennedy Rd., Bloomville, Ohio 44818

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	Fall-disc plant	Corn	25,600	20.97	116.6	$254.19	$188.90	$65.29

TILLAGE

1 Fall tandem disc - planted with John Deere 7000 conservation tillage planter

PLOT NO.		1
Tillage treatment		Disc-plant
TOTAL VALUE		$254.19
Seed, lime, misc.		$ 35.00
Fertilizer:	Broadcast 300# 6-15-40	22.05
	Starter 21 gal. 9-27-3+2s	20.40
	W/herbicide 60 gal. 28-0-0	34.71
Chemicals:	Herbicides	9.66
	Insecticides	11.00
Int. on operating capital, 7 mo. at 10%		7.75
TOTAL VARIABLE COSTS		$140.57
Machinery (custom rates)		
	Primary tillage	-
	Secondary tillage	$ 5.00
	Planting	10.00
	Cultivation	-
	Spraying, spread fertilizer	6.00
	Apply ammonia	-
	Harvest	18.00
	Trucking	9.33
TOTAL MACHINERY COSTS		$ 48.33
TOTAL COSTS		$188.90
Return to land, management		$ 65.29

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Ed and Dick Harer, 7487 Kennedy Rd., Bloomville, Ohio 44818

PLOT DETAILS

Planted Pioneer 3780 on May 7 in 30 inch rows. Intended seed drop was 29,900; of which 27,500 plants emerged in the Condit Tiro silt loam soils. Tile drainage is systematic but surface drainage is needed. 1978 crop was corn. 300# 6-15-40 was broadcasted in the fall. 240# (21 gal.) 9-27-3+2s was applied next to the rows. 178# N was applied with 60 gal. 28% for a total N-P-K as follows: 218-110-127+5s. 1.5 qt. Aatrex 4L and 1.7 qt. Bladex 4L were applied after planting. Good grass and broadleaf control except for some nutsedge and green foxtail. Heptachlor seed treater used and 14# Furadan 10G was applied in the seed furrow.

Crop residue on the surface through the growing season not only reduces erosion and aids weed control, but also conserves surface soil moisture for following months when moisture demands are high.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Donald Crum, 5473 New Haven Rd., Shelby, Ohio 44875

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Soybeans	170,000	13.90	49.1	$305.89	$124.37	$181.52

1 Planted with a Buffalo no-till slot planter, doubled back to make 15" rows.

PLOT NO.	1
Tillage treatment	No-till
TOTAL VALUE	$305.89
Seed, lime, misc.	$ 35.00
Fertilizer: Starter 200# 4-16-10	13.80
Chemicals: Herbicides	28.76
Insecticides	-
Int. on operating capital, 6 mo. at 10%	3.88
TOTAL VARIABLE COSTS	$ 81.44
Machinery (custom rates)	
Primary tillage	-
Secondary tillage	-
Planting	$ 20.00 (doubled back)
Cultivation	-
Spraying, spread fertilizer	3.00
Apply ammonia	-
Harvest	16.00
Trucking	3.93
TOTAL MACHINERY COSTS	$ 42.93
TOTAL COSTS	$124.37
Return to land, management	$181.52

[illegible] TILLAGE COMPARISONS [illegible] & ECONOMIC DATA

Donald Crue, [illegible] New Hope Rd., Shelby, [illegible]

PLOT DETAILS

Planted Kayne soybeans on June [illegible] in 15 inch rows. Planting rate of 200,000 seeds, of which approximately 170,000 plants emerged in the Alexandria, Cardington, Bennington silt loam soils. No tile drainage present. 1978 crop was corn. 200# 6-16-16 was applied at planting in the row for a total N-P-K as follows: 8-32-20. 1 qt. Paraquat CL with X-77 spreader at 8 oz., 100 gal. water, 3 qt. Lasso 4EC, and 3/4 pt. Sencor 4 were applied just after planting using 50 gal. water as carrier. Excellent grass and broadleaf control except for a few common ragweeds. Innoculation used. No insect problems. Harvested November 5.

Harvesting no-till beans after corn. Good weed control and minimal volunteer corn helped this plot yield 49 bu/ac.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Ross Eckstein, 6521 Johnston Rd., New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND MGT.
1	No-till	Soybeans	143,000	12.3	42.1	$263.13	$123.65	$139.48

TILLAGE

1 Planted with an Allis Chalmers 333 no-till air planter, doubled back to make 15" rows

PLOT NO.	1
Tillage treatment	No-till
TOTAL VALUE	$263.13
Seed, lime, misc.	$ 35.00
Fertilizer: Broadcast 212# 0-22-30	14.95
Chemicals: Herbicides	23.80
Insecticides	.50
Int. on operating capital, 6 mo. at 10%	3.72
TOTAL VARIABLE COSTS	$ 77.97
Machinery (custom rates)	
Primary tillage	-
Secondary tillage	-
Planting	$ 20.00 (doubled back)
Cultivation	-
Spraying, spread fertilizer	6.00
Apply ammonia	-
Harvest	16.00
Trucking	3.68
TOTAL MACHINERY COSTS	$ 45.68
TOTAL COSTS	$123.65
Return to land, management	$139.48

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Gary Green, 2841 Albaugh Rd., Bloomville, Ohio 44818

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	Spring disc-plant	Soybeans	140,000	18.6	25.3	$155.09	$168.54	-$13.45

TILLAGE

1 Spring disc, planted with an Allis Chalmers no-till plate planter

PLOT NO.	1
Tillage treatment	Disc-plant
TOTAL VALUE	$155.09
Seed, lime, misc.	$ 35.00
Fertilizer: Broadcast 24 gal. 6-18-6+2s	20.85
Chemicals: Herbicides	65.29
Insecticides	2.00
Int. on operating capital, 6 mo. at 10%	6.38
TOTAL VARIABLE COSTS	$129.52
Machinery (custom rates)	
Primary tillage	-
Secondary tillage	$ 5.00
Planting	10.00
Cultivation	-
Spraying, spread fertilizer	6.00
Apply ammonia	-
Harvest	16.00
Trucking	2.02
TOTAL MACHINERY COSTS	$ 39.02
TOTAL COSTS	$168.54
Return to land, management	-$13.45

[illegible]

Cary Green, [illegible]

PLOT DETAIL

Planted No-Crop [illegible] rows. Planting rate of 180,0[illegible] plants emerged in the [illegible] rows. Cardinal [illegible] 1978 [illegible] was applied for a total [illegible] pt. Paraquat CL w/16 oz. [illegible] and [illegible] pt. Sencor 4L were applied with the [illegible] fertilizer just after planting. This is not [illegible] phosphate will reduce the activity of the Paraquat, [illegible] giving complete [illegible] existing vegetation. [illegible] Ortho [illegible] surfactant was applied [illegible] and grass control poor, [illegible] not controlled. [illegible] triple-meeting [illegible]

All no-till corn planters [illegible] coulter to open or till the soil [illegible]. Adjustment of this coulter with [illegible] opener [illegible] is an important step in obtaining [illegible]

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Tom Niese, 7552 Sawyer Rd., Tiro, Ohio 44887

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	Fall chisel, stale /1	Soybeans	150,000	15.8	47.1	$291.08	$124.99	$166.09
2	Fall chisel	Soybeans	150,000	16.0	47.3	292.31	123.76	168.55
3	Fall chisel	Soybeans	150,000	16.5	41.0	252.77	127.26	125.51

TILLAGE

1 Fall chisel, field cultivate 3 weeks prior to planting, planted with Massey-Ferguson conventional drill
2 Fall chisel, field cultivate just before planting - planted with Massey-Ferguson conventional drill
3 Fall chisel, field cultivate and cultimulcher just before planting - planted with same drill

PLOT NO.	1	2	3
Tillage treatment	Fall chisel stale	Fall chisel	Fall chisel
TOTAL VALUE	$291.08	$292.31	$252.77
Seed, lime, misc.	$ 35.00	$ 35.00	$ 35.00
Fertilizer: Broadcast 300# 7-20-34	22.95	22.95	22.95
Chemicals: Herbicides	17.50	16.32	16.32
Insecticides	-	-	-
Int. on operating capital, 6 mo. at 10%	3.77	3.71	3.71
TOTAL VARIABLE COSTS	$ 79.22	$ 77.98	$ 77.98
Machinery (custom rates)			
Primary tillage	$ 7.50	$ 7.50	$ 7.50
Secondary tillage	5.50	5.50	5.50
Planting	7.00	7.00	7.00
Cultivation	-	-	-
Spraying, spread fertilizer	6.00	6.00	6.00
Apply ammonia	-	-	-
Harvest	16.00	16.00	16.00
Trucking	3.77	3.78	3.28
TOTAL MACHINERY COSTS	$ 45.77	$ 45.78	$ 49.28
TOTAL COSTS	$124.99	$123.76	$127.26
Return to land, management	$166.09	$168.55	$125.51

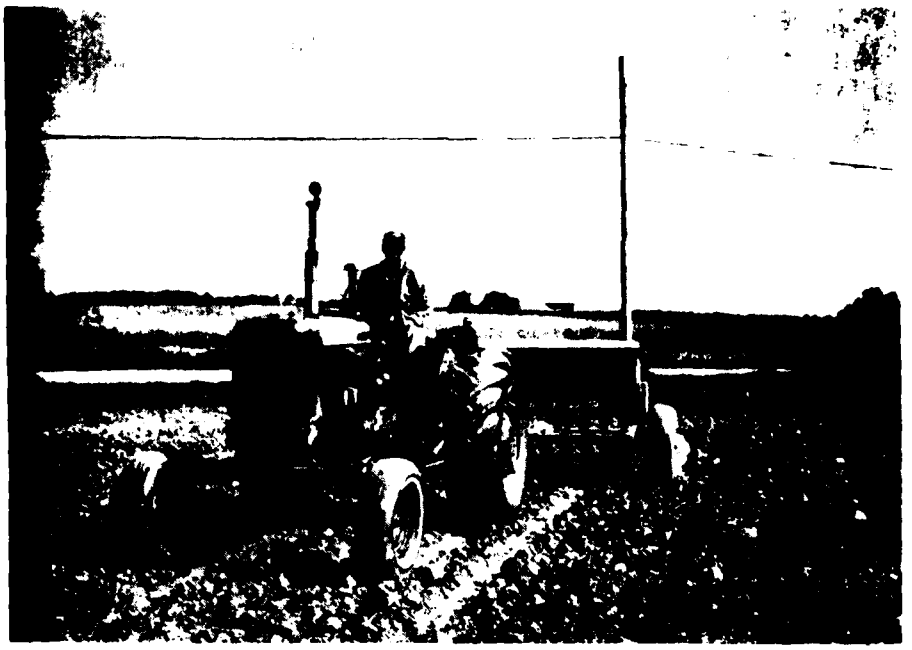
/1 Spring field cultivated 3 weeks before planting, whereas plots #2 and #3 were field cultivated just hours before planting.

1979 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Tom Niese, 7552 Sawyer Rd., Tiro, Ohio 44887

PLOT DETAILS

Planted Callahan 5250 soybeans in three plots on May 16, drilled in 6 inch rows. Planting rate of 205,000 seeds; of which approximately 150,000 plants emerged in the Marengo, Olmsted silty clay loam soils and Bennington, Cardington silt loams. Tile drainage is systematic. 1978 crop was soybeans. 300# 7-20-34 was fall broadcasted on all plots. 1 qt. crop oil, 3 pt. Dual 6E and 3/4 pt. Sencor 4L were applied on plot #1, while just 3 pt. Dual 6E and 3/4 pt. Sencor 4L were applied on plots #2 and #3. Excellent grass and broadleaf control in plots #1 and #2. Common ragweed and buttonweed in plot #3. No insect problems. Harvested October 15.



Planting reduced tillage [illegible]ans is another option open to farmers seeking fuel and t[illegible]vings. Increased surface roughness with previous crop re[illegible]due near the surface also helps erosion control.

NO-TILL AND REDUCED TILL HERBICIDE-INSECTICIDE RESULTS

Tables 7, 8, and 9 summarize the herbicide and insecticide treatments used on all no-till and reduced till plots. Overall grass, broadleaf, and insect control was good to excellent in 100% of the no-till corn and soybean plots. In reduced tillage plots only two were ranked poor to fair in any category. Following are specific observations made involving herbicide control:

1. Paraquat CL or Roundup 4EC was used in all no-till plots; Paraquat CL for quick burndown of existing vegetation and Roundup 4EC for a slower burndown, but more effective control on perennials such as quackgrass (Roundup translocates throughout plant). The total cost of the Roundup 4EC applications were included in plot production costs even though future years are benefitted. In three of the reduced till plots a low rate of Paraquat CL was used to insure control of young germinated grasses and broadleafs without extra tillage.

2. Carrier for Roundup 4EC applications was 30 gallons of water, while the carriers for Paraquat CL in corn plots were most often 28% nitrogen ranging from 34 to 71 gallons per acre, or water at 40 to 50 gallons per acre. By using 28% nitrogen an extra trip over the field was saved.

3. Grasses, especially fall panicum, were the main weeds considered before residual herbicide recommendations were made. The previous years herbicide, the possibility of plant injury from herbicide carryover, and next year's planned crop were also considered.

4. 2,4-D Amine and Banvel D were used post emerge in some plots for Canada thistle. This mixture was also used pre-emerge in one alfalfa-timothy sod plot on the Fritz farm. Basagran was used in one reduced till soybean plot to help control broadleafs not initially controlled (Green plot).

5. In most cases, residual herbicides were tank mixed with Paraquat CL and applied soon after planting. A separate application of Roundup 4EC was applied before planting in plots where it was used. Residual herbicides were then applied soon after planting.

Following were specific observations made involving insecticide control:

1. Wire worm, seed corn maggot, seed corn beetle - No significant cases of damage from any one of these insects seen in any plots. A planter box treatment was used in all no-till corn plots but one, and in 4 of 9 reduced tillage corn plots. Most treatments contained captan, a fungicide commonly used when planting early to protect the seed from damping-off disease and decay, and an insecticide such as diazinon or lindane to control one or more of the above pests probably under those conditions. One no-till soybean plot received planter box treatment.

2. Rootworms - No rootworm problems were observed in any plots. All corn plots but 3 were treated for rootworms at planting. In the future, cost savings for this treatment may be realized by adhering to crop rotations and by initiating a rigorous pest scouting program.

3. Slugs - No slug problems were encountered.

4. Cutworms - Cutworms were observed in a few of the no-till plots but never to any extent that needed treatment. In one reduced tillage plot on the Phenicie farm, spot treatment with Secin 50 WP had to be applied for cutworms.

5. Grasshoppers - No grasshopper problems were encountered.

6. European corn borer - One reduced till plot had enough borers feeding to make treatment economically feasible (Reichert farm). One no-till plot (Hoffert farm) had some borers present, but not to the extent that required treatment.

7. Flea beetles - No problems were encountered. Many of the plots did receive treatment where Furadan 10G was used.

8. Armyworms - No army worm problems were observed in any of the no-till or reduced till corn plots. Again, costs for initial treatment of acreage can be reduced by adherance to cropping rotations, pest management scouting, and other less expensive insecticide controls. Furadan 10G was applied in some plots for armyworm control.

9. There were no insect problems encountered in any of the soybean plots.

Scouting for pest problems is a good way to insure maintenance of the present crop and to learn which presticides work best. Field checking can help save pesticide costs and make pesticides more effective when needed.

Table 7 NO-TILL HERBICIDE-INSECTICIDE TREATMENTS (CORN)

Name	Cover type	Material /1	Acre Rates	Herb. Cost	Insect. Cost	Vol.-Herbicide Carrier
Hoffert	Soybean stubble	Paraquat CL Atrazine 4L Lasso 4EC	1 pt. 3 qt. 2 qt.	$21.56	$ 0.00	34 gal. of 28% N
Fritz	Alfalfa-timothy sod	2,4-D Amine (pre) Banvel D (pre) Paraquat CL Aatrex 4L Bladex 4L Isotox"F" Sd.Trt. Furadan 10G	1 pt. 1/4 pt. 1 qt. 2.5 qt. 2 qt. 4 oz/bu 14#	$26.08	$11.00	60 gal. of 28% N
Willman	Clover plowdown mixture	Paraquat CL Bladex 4L Aatrex 4L Isotox"F" Sd.Trt. Furadan 10G	1 qt. 2 qt. 2.5 qt. 4 oz/bu 15#	$23.68	$11.75	40 gal. of water
Smith	Clover plowdown mixture (2 plots)	Paraquat CL Aatrex 4L Bladex 4L Isotox"F" Sd.Trt. Furadan 10G	1 qt. 1.5 qt. 2.5 qt. 4 oz/bu 15#	$22.64	$11.75	40 gal. of water
Nedolast	Clover plowdown mixture (3 plots)	Paraquat CL Aatrex 4L Bladex 4L Banvel D (post) Isotox"F" Sd.Trt. Furadan 10G	1 qt. 1.8 qt. 2.4 qt. 3/8 pt. 4 oz/bu 15#	$25.06	$11.75	47 gal. of 28% N
Phenicie	Cornstalks (3 plots)	Roundup 4EC Aatrex 4L Bladex 4L Diazinon Sd. Trt. Furadan 10G	2 qt. 2 qt. 2.5 qt. 4 oz/bu 14#	$42.63	$11.00	20 gal. of water (Roundup 4EC) 65 gal. of 28%
Crum	Cornstalks (2 plots)	Paraquat CL Aatrex 4L Dual 6E Isotox"F" Sd.Trt. Furadan 10G	1 pt. 1.5 qt. 3 pt. 4 oz/bu 15#	$24.37	$11.75	40 gal. of water
Price	Cornstalks	Roundup 4EC Aatrex 4L Bladex 4L Isotox"F" Sd.Trt. Furadan 10G	2 qt. 2 qt. 2 qt. 4 oz/bu 14#	$41.00	$11.00	30 gal. of water (Roundup 4EC) 53 gal. of 28% N
Kalb	Cornstalks (2 plots)	Paraquat CL Aatrex 4L Dual 6E Isotox"F" Sd.Trt. Furadan 10G	1.5 pt. 1.5 qt. 4 pt. 4 oz/bu 15#	$25.95	$11.75	71 gal. of 28% N

/1 Non-ionic surfactant such as X-77 spreader was used with Paraquat CL to improve its effectiveness. Cost is included. This is an important management step in good vegetation suppression.

Table 7 (CONT.)

Over all Control /2			Remarks
Grass	Broadleaf	Insect	
Good	Excel.	Good	Weed - some foxtail and nutsedge not controlled Insect-some European corn borer damage
Good	Excel.	Excel.	Weed - some breakthrough of nutsedge and fall panicum
Excel.	Excel.	Excel.	
Excel.	Excel.	Excel.	
Excel.	Excel.	Excel.	
Good	Excel.	Excel.	Weed - fall panicum not controlled. Probably cause low pH affected triazines.
Excel.	Excel.	Excel.	
Excel.	Excel.	Excel.	
Excel.	Excel.	Excel.	

/2 "Good" and "excellent" control had no negative effect on yield - "poor" and "fair" control had a negative effect on yield.

Table 8 REDUCED TILL HERBICIDE-INSECTICIDE TREATMENTS (CORN)

Name	Cover type, some tillage done	Material /1	Acre Rates	Herb. Cost	Insect Cost	Vol.-Herbicide Carrier
Harer	Cornstalks	Aatrex 4L Bladex 4L Heptachlor Sd. Trt. Furadan 10G	1.5 qt. 1.7 qt. 4 oz/bu 14#	$ 9.66	$11.00	60 gal. of 28% N
Phenicie	Cornstalks (2 plots)	Paraquat CL Dual 6E Aatrex 4L Diazinon Sd. Trt. Furadan 10G	1 pt. 3 pt. 2 qt. 4 oz/bu 14#	$21.45	$11.00	60 gal. of 28% N
Kalb	Cornstalks	Paraquat CL Aatrex 4L Lasso 4EC Furadan 10G	1 pt. 1.5 qt. 2 qt. 13#	$17.95	$ 9.75	55 gal. of 28% N
Harer	Soybean stubble	Aatrex 4L Dual 6E Heptachlor Sd. Trt. Furadan 10G	2 qt. 3.3 pt. 4 oz/bu 14#	$16.43	$11.00	60 gal. of 28% N
Eckstein	Soybean stubble (2 plots)	Aatrex 4L Dual 6E	1.5 qt. 3 pt.	$14.07	$ 0.00	20 gal. of water
Reichert	Soybean stubble	Aatrex 4L Lasso 4EC Furadan 10G Furadan 10G (post)	2 qt. 2 qt. 13# 10#	$13.50	$17.25	50 gal. of 28% N

/1 Non-ionic surfactant such as X-77 spreader was used with Paraquat CL to improve its effectiveness. Cost is included. This is an important management step in good vegetation suppression.

Table 8 (CONT.)

Over all control /2			Remarks
Grass	Broadleaf	Insect	
Good	Excel.	Excel.	Weed - some nutsedge and foxtail breakthrough
Good	Excel.	Good	Weed - some fall panicum Insect - cutworms were treated in very small section of field with 4# Sevin 50W
Excel.	Excel.	Excel	
Excel.	Excel.	Excel.	
Excel.	Excel.	Excel.	
Excel.	Excel.	Fair	Insect - serious European corn borer damage treated in July with 10# Furadan 10G by plane

/2 "Good" and "excellent" control had no negative effect on yield - "poor" and "fair" control had a negative effect on yield.

Table 9 NO-TILL AND REDUCED TILL HERBICIDE-INSECTICIDE TREATMENTS (SOYBEANS)

Name	Cover type	Material /1	Acre Rates	Herb. Cost	Insect. Cost	Vol.- Herbicide Carrier
Crum	Cornstalks (no-till)	Paraquat CL Lasso 4EC Sencor 4L	1 qt. 3 qt. 3/4 pt.	$28.76	$ 0.00	50 gal. of water
Eckstein	Soybean stubble (no-till)	Paraquat CL Lasso 4EC Lorox 50 WP	1.5 pt. 2 qt. 2#	$23.80	$ 0.50	40 gal. of water
Niese	Soybean stubble (stale)	Crop oil Dual 6E Sencor 4L	1 qt. 3 pt. 3/4 pt.	$17.50	$ 0.00	20 gal. of water
Niese	Soybean stubble	Dual 6E Sencor 4L	3 pt. 3/4 pt.	$16.32	$ 0.00	20 gal. of water
Green	Cornstalks	Paraquat CL Dual 6E Sencor 4L Basagran (post)	1 qt. 3 pt. 1 pt. 2 qt.	$65.29	$ 2.00	24 gal. of 6-18-6+2s

/1 Non-ionic surfactant such as X-77 spreader was used with Paraquat CL to improve it's effectiveness. Cost is included. This is an important management step in good vegetation suppression.

Table 9 (CONT.)

Over all control /2			Remarks
Grass	Broadleaf	Insect	
Excel.	Good	Excel.	Weed - just a few common ragweed in low areas
Excel.	Excel.	Excel.	
Excel.	Excel.	Excel.	Weed - 1 pt. Paraquat CL was recommended instead of 1 qt. crop oil
Excel.	Good	Excel.	Weed - a few common ragweed and buttonweed especially in conventional plot
Poor	Fair	Excel.	Weed - fall panicum, crabgrass and initial broad leaves not controlled initially because phosphate in carrier fertilizer reduced Paraquat's activity. This was not recommended.

/2 "Good" and "excellent" control had no negative effect on yield - "poor" and "fair" control had a negative effect on yield.

SOIL LOSS CALCULATIONS

For all demonstration plots, soil losses (erosion) were calculated using the Universal Soil Loss Equation. Factors in the equation are rainfall amount and intensity, soil erodibility, slope length, slope steepness and conservation practices (reduced tillage, cross-slope farming, etc.). Rainfall information for the Project area was determined from charts published by the Soil Conservation Service. Soil erodibility data was taken from the same Soil Conservation Service publication, based on predominant soil types in the 5-15 acre plots. Slope length and steeness were measured in the field and amounts of surface residue were estimated shortly after planting. In soil loss calculations all residues were converted to corn residue equivalent; i.e., 500# soybean residue equals approximately 1000# corn residue.

To determine percentage reduction in soil loss as a result of no-till or reduced tillage, calculations were made comparing the reduced tillage practice with conventional fall plow operations for the current crop rotation.

Erosion control is directly and most significantly related to the amount of residue maintained on the soil surface. The two major factors in this calculation are 1) type and amount of residue and 2) the percentage of residue left on the surface by tillage practices. Without at least 1000# corn residue per acre, or 500# soybean, sod or small grain residue on the surface, soil erosion is not reduced. Calculations were made assuming the following amounts of residue produced per acre: 100 bu. corn produces approximately 5600#; 50 bu. soybeans produces approximately 2500#, 45 bu. wheat produces approximately 4500#; and 12-inch clover plowdown mixture produces approximately 1000# residue per acre. The amount of residue left on the surface after 30% winter loss is directly related to the type of tillage tools used, and the depth at which they are used. For example, the amount of residue incorporated below the surface for some different tillage operations are as follows:

Tillage operation	% incorporated
Moldboard plow	100%
Chisel w/twisted shanks (7" deep)	70%
Coultered chisel (6-7" deep)	60%
One-way disk (6-7" deep)	70%
One-way disk (4-5" deep)	50%
Field cultivator w/sweeps (4-5" deep)	30%
Flexible disk (3-4" deep)	25%

Table 10 DEMONSTRATION PLOT SOIL LOSS INFORMATION

Name	Price	Kalb	Crum	Crum	Kalb	Phenicie	Green	Harer	Fritz
Soil Type	Randolph & Tiro SiLo	Bennington SiLo	Bennington SiLo	Cardington SiLo	Cardington SiLo	Bennington SiLo	Cardington SiLo	Tiro SiLo	Bennington SiLo
Rotation /1	CSb	CSb	CSb	CSb	CSb	CSb	CSbWx	CSb	CCSbWm
Residue type	Corn	Corn	Corn	Corn	Corn	Corn	Corn	Corn	Alfalfa/ timothy
1979 Crop	Corn	Corn	Corn	Soybeans	Corn	Corn	Soybeans	Corn	Corn
Estimated # surface residue	6500	6000	4200	4200	2000	3050	2400	3000	1350
Estimated surface cover	70%	63%	61%	59%	44%	51%	35%	41%	95%
Slope length	250	150	175	180	125	300	200	250	250
Slope	3.0%	4.0%	2.5%	4.5%	4.5%	2.0%	3.5%	1.0%	1.5%
Allowed "T" soil loss /2 ton/ac/yr	3.0	3.0	3.0	5.0	5.0	3.0	5.0	4.0	3.0
Soil loss:									
- if fall plowed /3	7.5	11.9	7.5	12.4	10.8	6.6	5.6	3.3	2.5
- reduced tillage	-	-	-	-	4.0	2.6	2.3	1.3	-
no-till	.49	1.0	1.75	3.0	-	-	-	-	.7
Reduction over fall plow	93%	92%	77%	76%	63%	61%	59%	61%	72%

/1 C = corn, Sb = soybeans, W = wheat, m - meadow, x = clover cover crop
/2 T = tolerable soil loss in ton/ac/yr for a certain soil type
/3 If spring plowed, soil loss would be decreased by only 12-15%

Table 10 (CONT.) DEMONSTRATION PLOT SOIL LOSS INFORMATION

Name	Harer	Reichert	Eckstein	Eckstein	Hoffert	Niese	Willman	Phenicie	Smith	Nedolast
Soil type	Tiro SiLo	Blount SiLo	Bennington SiLo	Bennington SiLo	Tiro SiLo	Bennington SiLo	Blount SiLo	Cardington SiLo	Blount SiLo	Lenawee SiClayLo
Rotation /1	CSb	CSb	CSb	CSbSb	CSb	SbSbW	CSbWx	CSbCSbWx	CSbW	CSbW
Residue type	Sb	Sb	Sb	Sb	Sb	Sb	Clover	Clover	Clover	Clover
1979 crop	Corn	Corn	Corn	Soybeans	Corn	Soybeans	Corn	Corn	Corn	Corn
Estimated # surface residue	900	600	700	1200	1100	300	1200	1900	1300	1000
Estimated surface cover	22%	11%	12%	26%	25%	5%	84%	90%	94%	75%
Slope length	250	300	300	200	180	275	275	150	180	700
Slope	1%	5%	4%	2%	1%	1.5%	3%	4%	2.5%	0.3%
Allowed "T" soil loss /2 ton/ac/yr	4.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	3.0	4.0
Soil loss:										
- if fall plowed /3	3.3	10.3	13.4	6.2	2.9	3.6	5.3	8.2	4.4	1.4
- reduced tillage	2.1	7.8	10.8	-	-	3.6	-	-	-	-
no-till	-	-	-	2.0	1.5	-	1.5	1.5	1.1	0.1
Reduction over fall plow	36%	24%	19%	68%	48%	0%	72%	82%	75%	93%

/1 C = corn, Sb = soybeans, W = wheat, m - meadow, x - clover cover crop
/2 T = tolerable soil loss in ton/ac/yr for a certain soil type
/3 If spring plowed, soil loss would be decreased by only 12-15%

SUMMARY - CONCLUSIONS

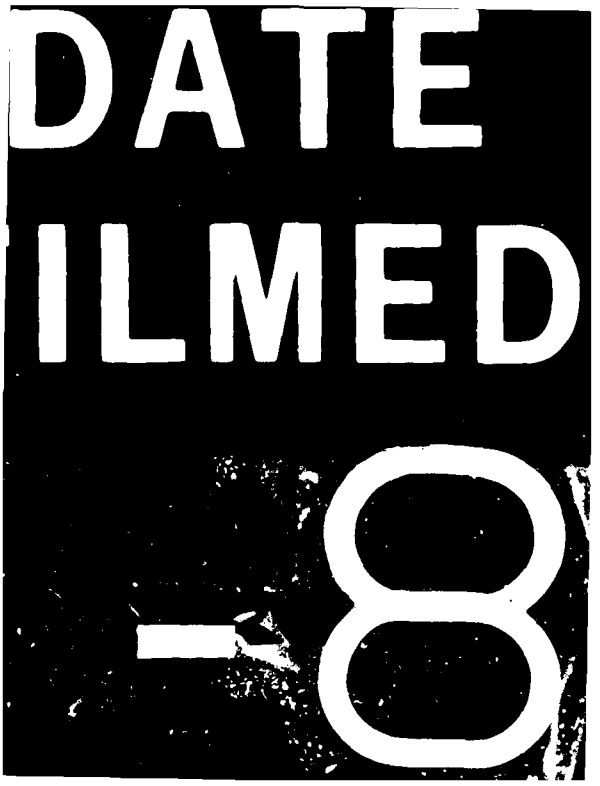
1. With only short range planning, reduced tillage and no-tillage practices were successfully demonstrated during a cool, wet growing season.

2. Economics of reduced and no-tillage systems appears favorable after one year of observation. Of the 31 reduced and no-tillage plot variations done for both corn and soybean cropping systems, 28 showed positive net returns ranging from $40 to $179 per acre and averaging $97 per acre. Net returns from the other 3 plots ranged from -$36 to -$9 per acre, averaging -$19 per acre. In these plots minor changes in management steps would seemingly have produced positive net returns as well. (See economic data for each plot beginning on page 12). There were too few conventional tillage plots to make accurate comparisons between conventional and reduced tillage performances. However, it was felt that reduced till and no-till tillage systems were at lease as profitable as the conventional tillage systems in the area.

3. Erosion reduction with reduced and no-tillage practices can be significant. From calculations done on 19 plots having a variety of crop rotations, 14 showed an estimated soil loss reduction of 50% or more while 7 plots showed reductions of 75% or more. No plots showed an increase in soil loss. This data suggests that on site retention of nutrients, particularly phosphorus, would be markedly greater, as well.

4. Learning proper management steps is the key to successful reduced no-tillage operations. A program to help demonstrate good crop stands having good weed control and comparable or increased yields is the quickest way to gain acceptance of these practices. Adequate stands and weed control in demonstration plots was quite important for practice acceptance within the Honey Creek Project area.

Keeping soil and fertilizers on the land not only increases yields but also decreases costs of cleaning lakes, streams, ditches and harbors.


DATE
ILMED
-8